GROWING DRYLAND CANOLA IN 2007

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Take home message

The keys to lower-risk and more profitable canola growing this year will be correct sowing time, sufficient subsoil moisture in medium or low rainfall environments, close crop monitoring and managing production costs while maximising yields.

Summary

Although the recent dry years have generally favoured cereals over canola, remember the crop's good points before we "throw the baby out with the bathwater".

- Wheat yields average 20% more after canola than after wheat, and a canola-wheat rotation is on average more profitable than wheat-wheat.
- Canola is an essential part of integrated weed management.
- Global oilseed prices are strong in the short, medium and long term.
- Victoria needs more agronomic and financial benchmarking of canola.
- Canola performs best with early sowing. Yield loss averages about 5% per week delay in sowing.
- Subsoil moisture takes out the risk of canola growing in the medium to low rainfall areas - each mm can translate into about 15kg/ha of grain.
- Aim to carefully manage production costs without sacrificing yields.
- Splitting N applications helps reduce up-front costs of growing canola and removes some risk.
- Other methods for managing costs are discussed.

Benefits of canola

Rotational benefits

Crop rotations have been pushed to the limit in some regions. Canola is one of the best break crops around. Extensive surveys and trials across Australia have found that wheat yields are around *20%* higher after canola than after wheat (Angus *et al*., 2001; Kirkegaard *et al*., 2006; Potter *et al*., 1997). A survey of 226 Victorian wheat crops in 1995 showed that wheat yields were highest following canola (3.9 t/ha), compared with wheat on pulse (3.1 t/ha) or fallow (3.2 t/ha) (Norton *et al*., 1999).

Other benefits of canola are:

- Cleaner paddocks to sow a cereal into;
- Less problems with grass weeds building up;
- Herbicide resistance management, particularly the TT varieties which allow growers to leave out a group A herbicide;

- Root diseases are also reduced after canola – including *Rhizoctonia* (Roget & Vadakattu, 2006).Take-all, crown rot, CCN and Pratylenchus can build up rapidly in paddocks with good hosts (Harris and Lott, 2004).
- The current price of canola (17 Jan. 2007) is $455/t delivered Geelong and is likely to stay strong due to global demand for oilseeds. The long-term average from January 1995 to present is between $365-370/t (industry source).

Benchmarking

Most guidelines for growing canola in Victoria are based on Canolacheck (benchmarking of crop monitoring data) and trial data from the wetter years of the early to mid 1990's. Since then, many growers and advisors have found out through their own trial and error how to grow canola in unfavourable seasons.

The rice industry has been highly successful in improving yields and agronomic recommendations based on key checks through the NSW DPI's Ricecheck program.

Benchmarking the agronomic and financial information allows advisors to compare the management of the top-performing crops with the average and the poorer performing crops, and use this as a basis to develop recommendations. A number of private companies along with the NSW DPI are involved in benchmarking, but the information gathered and methods used for benchmarking vary. ***It is now time for Victorian canola growers to become involved in crop monitoring again*** to draw on the current knowledge and experiences of each other to lift the productivity of canola Statewide. Close crop monitoring will be critical to get the best of 2007.

Time of sowing

Optimum sowing time and flexibility

The optimum sowing time for canola is late April to mid-May for southern/central Mallee, but canola should be sown before the end of May. Late April to mid-May is also the ideal sowing time in the Wimmera, northern Victoria and the northeast, but can be extended until mid-June in these regions. In the Western District, canola is best sown on well-drained soils anytime from the beginning of May onwards. Later sowings are possible because of the better chance of cool and moist conditions in spring.

In the 1990s, early July sowing was not considered a problem in the Wimmera, but the run of dry seasons that changed growers' thinking. This year, if a really good break has not occurred by mid-May or even mid-June in the northern Wimmera, growers will certainly need to closely consider their options and be prepared to look at alternatives.

In the Mallee, canola should be seen as an opportunity crop to take advantage of a good early break and a forecast for a favourable season.

Sowing canola late is costly - especially in dry environments

On a % basis, cereals are generally less affected by late sowing than canola. (Potter & Lynch, previously unpublished data) (Figure 1).

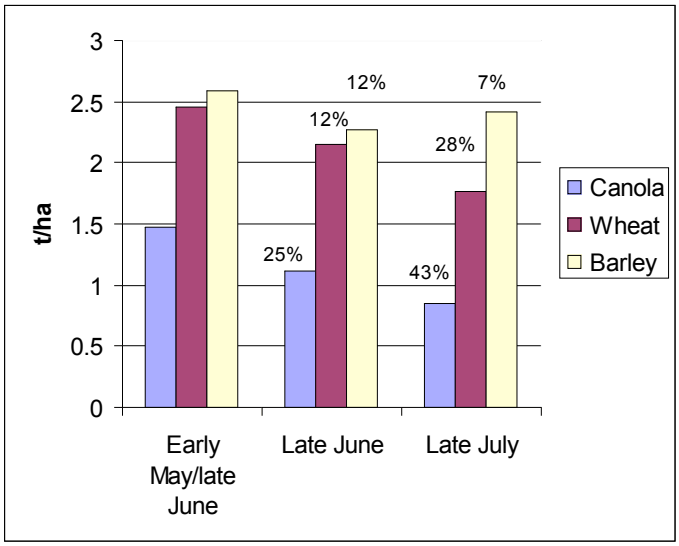

Figure 1: Effect of sowing time on yields (t/ha) of canola and cereals from 1993-1995 at Kapunda and Spalding, SA, with % yield loss relative to the first sowing shown above the bars.

South Australian trials have shown that canola yields drop by an average 5% per week delay in sowing (Potter & Lynch, unpublished data). The same result was found in 1998 simulation studies of canola and *Brassica juncea* in the northern region (Robertson *et al.,* 1999).

But the penalty for late sowing is greater in drier seasons or sites (Tables 2), with yields dropping by as much as to 17.5% per week (Pritchard, 1998). (Struan experienced a dry finish in 1993).

Table 2: Effect of site and sowing date on average yield (t/ha) of 8 *B. napus* varieties/lines and, in brackets, yield loss (%) per week's delay in sowing where significant.

Yr	Date	Horsham	Date	Walpeup	Date	Struan (SA)	Date	Streath -am	Date	Natte Yall-ock	Date	Wagga Wagga (NSW)	All sites
'93	26/6 28/7	1.96ns 2.09	6/7 29/7	0.66ns 0.60	26/8 15/9	1.66* 0.83 (17.5%)							1.38ns 1.22
'94	21/6 5/8	0.73* 0.14 (12.6%)	10/6 11/7	0.18ns 0.00	1/7 11/8	1.69* 0.86 (8.4%)	2/6 12/9	3.03* 1.42 (3.6%)					1.41* 0.61
95	15/6 16/8	1.31* 0.81 (4.3%)	15/5 15/6	0.79ns 0.85	22/5 21/6	2.32* 2.93 (-6.1%)	22/5 8/9	0.75* 0.04 (6.1%)	29/5 5/7	1.92ns 1.77	7/6 11/8	1.18* 0.93 (2.3%)	1.43ns 1.17

LSD within the same year at p=0.05; ns=not significantly different from other sowing time at same site; *=significantly different (p<0.05) from the other time of sowing at same site; TOS = time of sowing.

In the dry year of 1994, the sowing date accounted for 14% of the variation in yields, but in the wetter years, its effect was very small. In other words, ***you generally can't get away with sowing late in dry years, especially in the low and medium rainfall zones.*** In such situations, a fast onset of warm, dry conditions in spring brings about big yield and oil penalties for late sowing.

Yields were closely correlated to in-crop rainfall and the number of days above 32^{o}C, but *not* the average temperature from the start of flowering. Temperature had a bigger effect on oil content: the oil content rose by 0.8% for each 1^{o}C drop in average temperatures from flowering to maturity, but only by 0.2% per 10 mm of in-crop rainfall (Pritchard, 1998). The effect of spring temperature helps explains why in some years we have low oil content with good yields.

Calculating potential yields using sowing date and subsoil moisture

Recently, a modified simple potential yield calculation has been developed based on southern NSW data which factors in time of sowing and available stored moisture. It has a better correlation than older models (r^2=0.68) where in-crop rainfall is less than 450 mm (Robertson & Kirkegaard, 2005 ; see http://www.grdc.com.au/growers/as/pdfs/canola.pdf). See appendix 1 for examples.

Sowing very early

Very early sowing can cause excessive growth and lead to haying off and sometimes lodging.

Frost risk

Delaying sowing to prevent frost is not a good strategy for canola. It needs to be balanced with the greater risk of poorer yields from increasing moisture deficit and higher temperatures. In fact, the lateness of severe frosts in October/November 2006 meant it was the later maturing varieties that were more affected in Western District trials. While canola is sensitive to severe frost, its 4-6 week flowering period means that it is more frost tolerant than cereals as it can usually compensate for flower abortion.

Stored subsoil moisture

Recent seasons have shown the importance of subsoil moisture to canola in the low and medium rainfall areas. Every 10 mm of stored water translates into at least 0.15 t/ha of canola grain if in-crop rainfall is between 160-270 mm, according to APSIM modeling for Forbes, NSW. The relationship is weaker in drier or wetter years (Robertson, 2004).

Early removal of summer weeds helps retain stored moisture and nitrogen.

The rainfall required to bring a bone dry soil profile up to wilting point would be about 120 mm for a heavy red clay (eg eastern Wimmera/southern Mallee), about 110 mm for a self-mulching grey clay and around 30-40 mm for a Mallee sand (Christie R., pers. comm.).

Variety selection

Trials in south-east Australia showed that 48-72% of variation in canola yields was due to site, while 8-19% came from variety choice (Pritchard, 1998).

Maturity

If timely sowing is not possible this year, choose an earlier maturing variety if in a high rainfall zone and start to assess your options if in a medium rainfall zone. Avoid sowing canola beyond the end of May in the low rainfall areas (see Table 4).

Table 4: Effect of site and time of sowing on average yield (t/ha) and oil content (in brackets) of canola in 1993 and 1994 at medium rainfall sites, Spalding and Kapunda, SA (Potter & Lynch, unpublished data).

Maturity type	Late/May/early June	Late June	Late July
Early	1.48 (43%)	1.21 (42%)	0.99 (40%)
Mid	1.54 (43%)	1.12 (42%)	0.84 (41%)
Late	1.42 (43%)	0.98 (43%)	0.71 (40%)

Disease resistance

The risk of blackleg is still an issue this year. Choose varieties with a minimum blackleg resistance rating of 4 for low rainfall areas and a minimum of 6 for other areas. Refer to the Australian Blackleg Management Guide – (see http://canolaaustralia.com/__data/page/80/BMguide.PDF).

Juncea canola

Juncea canola is suited to environments with a yield potential below 1.5 t/ha – such as the Mallee, or with spring sowing in high rainfall areas. One new juncea canola variety has been released this year on a small scale. Costs for juncea canola are lower, as seed will be cheaper, it does not require windrowing and nutrient requirements are similar to wheat (Burton, W., pers. comm.).

Paddock selection

The old message to grow canola in the best wheat paddock still holds true. Avoid frost-prone paddocks where possible and take into account the proximity to canola stubbles or past canola paddocks. Also consider herbicide residues following the drought, and strictly adhere to minimum re-cropping periods as there will be no room for error this year.

Dry sowing

Dry sowing has its risks, but experience from growers in recent years with late breaks has shown that dry-sown crops have generally performed much better than crops which have been sown later on cultivated soil. However, dry sowing with no subsoil moisture is a risky proposition.

Reducing the up-front costs of canola

Ten years ago, the variable costs for growing canola in the Wimmera was around $197/ha (O'Brien & Semmel, 1997). In 2006, it was around $282/ha.

Managing costs without compromising profitability is important. Benchmarking of the 2004 canola crop of clients of Holmes and Sackett (mainly in NSW, but also Victoria and Tasmania) found that the most profitable and water-use efficient canola crops had lower variable costs (but higher fixed costs), and vice-versa. (Holmes Sackett & Assoc., 2006).

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Nutrition

Nutrient inputs need to be tailored to target yield. Fertiliser, particularly nitrogen, is the biggest single variable cost for canola and carries with it financial risk if the season

shapes up poorly. Trials in NSW and Bendigo have shown that delaying or splitting N fertiliser applications usually has no yield penalty associated with it when there is at least 40 kg/ha N in the top 50 cm at sowing time (Norton R., pers. Comm.; CWFS, undated). Unlike N, there is no room for error, but there may be certain situations where P rates may be reduced this year.

Fungicide seed treatments

Responses to fungicides are much less likely with blackleg resistant varieties. In Victoria, there's usually no advantage in using a fungicide when the blackleg rating is over 6.5 (Marcroft, pers. comm.). In Southern NSW, responses to fungicides are more common, but are far less marked in resistant varieties. Jockey was more cost-effective in trials, on average, although there were more responses to Impact and Maxim had little effect (Kirkegaard *et al.,* 2006).

Sowing rates

Plant densities of 30-50 plants/m^2 are ideal for the medium rainfall areas, while 50-75 is ideal in southern Victoria, and many growers are achieving much higher plant densities than this (As a general rule 1 kg/ha seed produces 25 plants/ m^2). While rates of 6 kg/ha are common, one no-till Wimmera grower has successfully reduced his sowing rate to 1 kg/ha without penalty. In trials in SA, so long as plant population was no lower than 20 plants/m^2, grain yield was reduced by 12-16% below that achieved with a population of 50 plants/m^2 (Potter *et al*., 1999).

Retaining seed may be false economy

Seed from 2006 should be germination tested before sowing. Sowing retained seed is not recommended. Trials have shown an average 12% yield decline with poor-quality retained seed (and in one case, complete crop failure) when the crop suffered from a dry finish. Yields of crops sown with certified seed were more consistent than farmer-retained seed. (Marcroft. *et al.,* 1999).

Growers should never retain seed from a crop which was planted from retained seed due to potential changes in the variety's characteristics due to genetic drift as a result of outcrossing. If considering retaining seed, growers should be aware of the costs associated with germination testing, grading, storage, and potential weed problems. (Marcroft. *et al.,* 1999).

Price outlook

The price outlook for Australian canola is strong in the short-term due to the drought ($90/t above average). They will remain buoyant in the medium to long-term due to strong demand for biofuels which is resulting in an increased area of corn at the expense of soybeans in the US.

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Appendix 1

Examples of potential yield for canola at various Victorian sites, as estimated by the improved potential yield calculator. This example assumes no soil moisture is left at harvest. Target ytields may be lower in some situations (eg subsoil limitations).

TOS			Mid-May	Mid-June
WUE (kg/ha/mm)			9.35	8.8
Site	In-crop rain (mm)	Available soil moisture (mm)	Potential yield (t/ha)	
Birchip	251	0	2.35	2.21
	251	20	2.53	2.38
	251	40	2.72	2.56
Longerenong	285	0	2.66	2.51
	285	24	2.89	2.72
	285	48	3.11	2.93
Elmore	308	0	2.88	2.71

	308	37	3.23	3.04
	308	74	3.57	3.36
Willaura	356	0	3.33	3.13
	356	53	3.82	3.60
	356	106	4.32	4.07